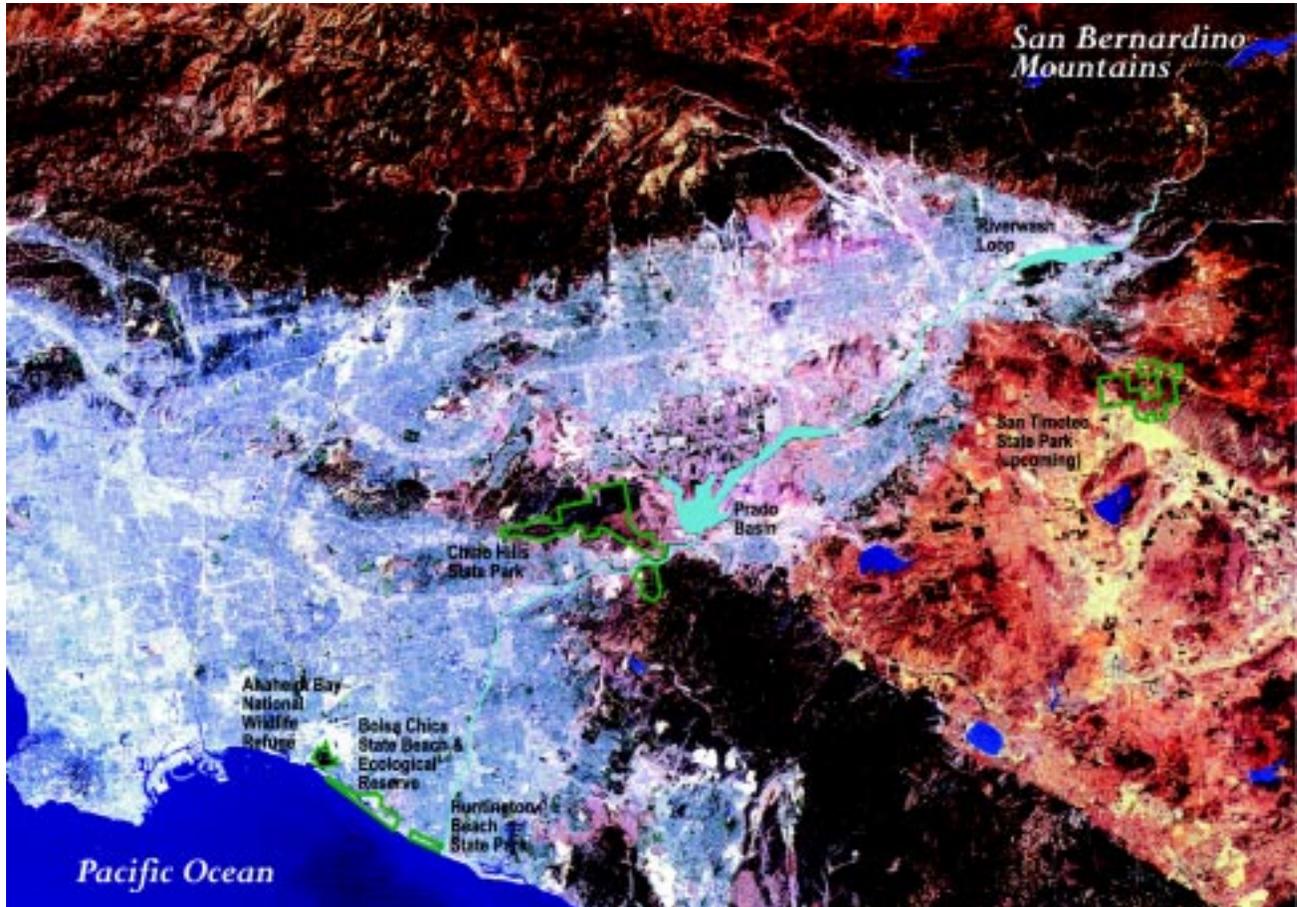




EXECUTIVE SUMMARY



View of the Santa Ana Watershed from space.

Purpose

The purpose of the Santa Ana Integrated Watershed Plan (IWP), Environmental and Wetlands Component is to provide a framework for the integration and coordination of future environmental enhancement planning efforts and partnerships within the Watershed with the intent of restoring the ecological functions of systems, where possible.

This document attempts to capture a “snapshot” of the current state of the Watershed by providing an inventory of resources and opportunities brought to the forefront through the Plan’s outreach activities and four scoping

meetings. Representatives from the Watershed’s water community, cities, counties, special districts, and community-based organizations came together in July and August 2002 to exchange important ideas and project information, and over 150 groups and individuals provided input. A common desire expressed by the Watershed community was the need for more funding to ensure that good projects within the Watershed are not only identified, but more importantly, that they are implemented. This Plan is not exhaustive, but rather a forward thinking document that moves the Watershed farther along in the quest for conservation and enhancement of the Santa Ana Watershed’s rich environmental heritage.



What's special about the Santa Ana Watershed?

The Santa Ana Watershed is home to a dazzling array of habitat types, including coastal bluff, riparian woodland, and coastal sage scrub. World-renowned ecologist E.O. Wilson has named Southern California one of the top 18 biodiversity hot spots in the world, and Myers, et. al. recognized coastal California (encompassing the Santa Ana Watershed) as one of 25 worldwide hotspots in their notable paper “Biodiversity hotspots for conservation priorities” published in the journal *Nature* in 2000. A hotspot is an area featuring exceptional concentrations of endemic species and experiencing exceptional loss of habitat. The Prado Wetlands provides an excellent example of a resource that has not, to date, been rated a conservation priority among state resource agencies and yet it is the largest freshwater wetland in Southern California and serves as a critical staging area for migratory birds along the Pacific Flyway, in addition to providing habitat for endemic endangered species. Conservation of the Santa Ana Watershed’s resources is vital to the ecological health of the region, the State, and the world.

Extraordinary Resources Within the Santa Ana Watershed Requiring Continued Coordination, Planning, and Protection:

Prado Wetlands is the largest freshwater wetlands in Southern California and the largest constructed wetlands in the world; it has led to the stunning recovery of the federally endangered least Bell’s vireo population.

Bolsa Chica Wetlands is a 300-acre coastal sanctuary for wildlife and migratory birds; 163 pairs of endangered Belding’s Savannah sparrows live, breed, and nest at Bolsa Chica.

Although largely an urban watershed, the Santa Ana Watershed also includes many wild, untouched areas such as the San Bernardino National Forest and Cleveland National Forest. These wild areas are linked by riparian corridors and significant habitat such as the San Timiteo wetlands—home of the least Bell’s vireo. From conifer forests to riparian forests, from chaparral to coastal sage scrub habitat, and from aquatic and wetland habitat to salt marshes, the Watershed is home to a large concentration of endangered species. Both Prado and Bolsa Chica wetlands among many others also serve as a critical staging area for migratory birds along the Pacific Flyway.

Irvine Ranch Land Reserve, totaling approximately 50,000 acres is prized for its beauty and unique geological and natural diversity including the 5,500-acre Limestone Canyon and the “Sinks,” a striking formation frequently compared to a miniature Grand Canyon

Western Riverside County Multi-Species Habitat Conservation Plan conserves approximately 510,000 acres of open space including significant oak woodland and coastal sage scrub habitat

San Bernardino Valley-wide Multi-Species Habitat Conservation Plan encompasses



approximately 500 square miles containing six unique habitat types, six state endangered species, 13 federally endangered or threatened species, and over 53 species of special concern.

Orange County Central Coastal NCCP Subregional Plan establishes a 37,380-acre reserve system covering 39 sensitive plant and animal species

Orange County Southern Subregion NCCP/HCP will protect 91,000 acres of habitat

Federally and/or State-listed species within the Watershed include: Santa Ana River sucker, arroyo toad, least Bell's vireo, southwestern willow flycatcher, bald eagle, San Bernardino kangaroo rat, Stephen's kangaroo rat, Santa Ana River woolly star, slender-horned spineflower, and Delhi Sands flower-loving fly.

Plan Recommendations

Plan recommendations provide form for the document and are intended to allow jurisdictions to advance, promote, and enable four integrated concepts: Improve water quality, protect and restore habitat, engage the community through education and recreation, and plan for the future. Strategies translate plan recommendations into specific project activities or programs. A number of these projects and opportunities are already in progress or will be established during the preparation of this Plan, including

- Creation, restoration, and enhancement of native and treatment wetlands (and riparian systems) to improve habitat, water quality, and recreational opportunities
- Enhancement of habitat for the threatened Santa Ana Sucker and other endangered species, in addition to other

aquatic resources that are not yet listed, such as native fish, reptiles, and amphibians in the Watershed

- Identification of other open space, land acquisition, and habitat improvement opportunities with the intent of addressing environmental, recreational, and educational needs of the Watershed while planning for increased water supplies and improved water quality
- Removal of invasive exotic species, such as giant cane (*Arundo donax*) from the Watershed to restore riparian habitat and to increase available surface water
- Completion of the Santa Ana River Trail and Parkway to provide public river access for non-motorized transportation, where feasible, and to provide recreational and educational opportunities to showcase the Santa Ana River and provide a place for people to enjoy this wonderful resource

Each of these opportunities requires partnerships among federal, State, and local governments, in addition to the Watershed community at large. The Santa Ana Watershed Project Authority (SAWPA), as the coordinating body for this Plan, works with its five member agencies, the four counties that comprise the Watershed, the governments of the Watershed's 59 cities, nearly 100 water-related agencies, and the Watershed's 5.1 million residents, in addition to State and federal agencies such as the California Resources Agency, the State Water Resources Control Board, the California Department of Fish and Game, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers.



Restoration means the reestablishment of the structure and function of the Santa Ana Watershed ecosystems. Ecological restoration is the process of returning an ecosystem as closely as possible to predisturbance conditions and functions. It is not possible to recreate an ecosystem exactly because they are naturally dynamic. Nor is it possible or desirable to be exact because human use of the landscape may have precluded or provided many options. The restoration process is used to reestablish the general structure, function, and dynamic but self-sustaining behavior of the ecosystem. As this is accomplished, the natural biological attributes of the system return, such as native plants, fish, birds, and other wildlife that enriches the quality of life for everyone. Many times this natural environment is the reason that people move into an area, only to see it disappear as ecosystems are disrupted and displaced.

As natural ecosystem processes are altered by human activity, vegetation is changed, and hardscape increases, infrastructure maintenance costs increase and the original values of living in an area are altered. A return to a more natural self-sustaining system can often lower infrastructure costs, raise property values, and reconnect people with the natural wildland beauty of the Santa Ana Watershed.

Watershed Structure and Function Restoration Recommendations

These restoration recommendations are intended to allow jurisdictions, communities, and groups to advance, promote, and enable the concepts below.

Recommendation #1: Improve Water Quality and Preserve and Improve Ecosystem Function

- 1-A. Develop water treatment wetlands and channels to improve water quality in a sustainable manner and provide multiple benefits.
- 1-B. Protect, restore and widen riparian vegetation corridors to reduce impacts of stormwater runoff, improve water quality, provide habitat, and improve aesthetics.
 - Reintroduce vegetated buffer strips wherever possible along stream banks to reduce the force of a flooding current against the bank, slow water overflowing channel banks, and allow sediment to deposit.
 - Ensure that riparian vegetated buffer strips are as wide as possible, although a narrow strip is better than none at all.
- 1-C. Carefully plan human activities to reduce erosion.
- 1-D. Continue to utilize technologically advanced sustainable solutions to resource management dilemmas, such as water quality improvements.
- 1-E. Reduce or eliminate beach closures through water quality improvements and reduction of contaminant discharge into the Pacific Ocean.

Recommendation #2: Protect and Restore Habitat Resources

- 2-A. Restore natural wetland habitats in flood plains of the River and its tributaries.
 - Look for opportunities in natural undeveloped areas to add wetlands that will increase complex natural habitats in juxtaposition to the stream system.



- Connect wetlands to the stream corridor through the addition of channels and vegetation.
- 2-B. Protect and restore remaining native species and habitats.
- Recreate meanders and backwaters where possible within the River and its tributaries to enhance native fish habitat.
 - Create drop structures and other oxygenation devices that do not inhibit fish passage.
 - Reestablish riffle substrates.
 - Develop instream structures to promote pool and flow complexes.
- 2-C. Identify public and private agencies and organizations to maintain acquired lands and funding sources.
- 2-D. Acquire key parcels of land for conservation.
- Establish conservation goals and target selection criteria.
 - Identify key potential parcels based on selection criteria.
 - Negotiate conservation easements as an alternative to outright purchase of lands.
- 2-E. Promote the identification, establishment, and protection of wildlife corridors.
- 2-F. Connect upland vegetation and habitats through edge habitats and corridors.
- Locate isolated habitat patches and establish corridors suitable to increase the habitat diversity available to all species.
 - Plant native trees, shrubs, grasses, and forbs (herbs) to establish wildlife-friendly pathways along roads and channels.
- 2-G. Remove and control invasive exotic species.
- Continue active programs for removal of established invasive species.
 - Identify and control recently established invasive species to prevent further spread.
 - Prevent introduction of future invasive species.

Recommendation #3: Engage the Community through Education and Recreation

- 3-A. Improve recreational opportunities for the region, including access to streams, lakes, and beaches through dedication of easements and land acquisition.
- 3-B. Increase water conservation and decrease imported water use through public education and provision of water saving devices.
- 3-C. Involve the public through outreach and education coordinated with the agencies and schools in the watershed.
- 3-D. Increase available open space throughout the region, including balancing open space availability among various communities by increasing parkland acreage in densely urbanized areas.

Recommendation #4: Plan for the Future

- 4-A. Facilitate partnerships among groups with similar goals and support community based sub-watershed groups.



- 4-B. Work with the State Resources Agency through the California Watershed Management Forums and other State and regional agencies to achieve State and regional goals.
- 4-C. Use the best scientific data available and regional collaboration to make complex resource management decisions.
- 4-D. Promote effective watershed monitoring, data management, and project evaluation programs.
- 4-E. Identify and pursue future sources of funding to complete watershed projects. Funding source identification should include provisions for operation and maintenance of projects in addition to capital expenditures.
- 4-F. Utilize this Santa Ana Integrated Watershed Plan, Environmental and Wetlands Component as a living document, including regular updates to maintain current watershed-wide planning and coordination.

According to the California Environmental Dialogue, habitat protection, restoration, and enhancement leads to economic benefits relative to natural systems, recreational and leisure industry, and reduction of conflict caused by species extinction, among other concerns. In particular, “the protection, enhancement, and restoration of California watersheds, riparian stream zones, and wetlands will reduce the need for costly new water treatment plants, provide high quality drinking water at reduced cost, reduce costs of flood damage, and improve water quality for aquatic ecosystems and human recreation.” When considering why the Santa Ana Watershed community is interested in pursuing strategies, recommendations, and projects/opportunities identified in this document, one can reflect upon the fundamental nature of the rich ecological

resources within the Watershed as well as the community’s interest in protecting these resources for present and future generations.

Strategies

1. Creation, Restoration, and Enhancement of Wetlands

Future Wetland Projects within Santa Ana Watershed

California has experienced an 85 to 90 percent reduction in wetland acreage and leads the United States in wetland loss, tying only with Ohio. Within the Santa Ana Watershed, little information is available on historic wetlands, and loss estimates are uncertain. However, watershed planners within the Santa Ana Basin are working towards restoring natural wetlands and providing treatment wetlands to provide cleaner water while providing high value habitat, recreation, and educational opportunities. SAWPA and its member agencies are committed to assist with the planning and implementation of native and treatment wetlands within the Santa Ana Watershed. For example, the County of Orange has adopted a policy requiring all streams, tributaries, and channels to include a treatment wetland system to improve water quality in the region. For more information on planned wetland projects, please consult Section 3A-1.

Implementation

1. When siting created/constructed wetlands, project proponents should take care not to destroy valuable native riparian habitat.



2. Created/constructed wetland projects should be designed to serve as multi-benefit projects in addition to improving water quality, including increased habitat value, improved aesthetics, and expanded recreational opportunities, hiking trails, educational components and opportunities for observation (where feasible).
3. Most desirable wetland projects are those that address as many functions as are obtainable (e.g., wetland habitat, water quality, treatment, aesthetics, etc.).
4. Wetland projects should be designed to be durable and either resistant to potential flood damage or quickly recoverable after flooding.
5. Wetland projects should be designed to minimize the production of vector species.
6. Wetland projects should be designed to be low maintenance.

2. Removal of Invasive Species

Because this exotic plant alters ecosystem dynamics and interrupts and redirects succession, the removal of *Arundo donax* from the Watershed offers numerous direct and indirect benefits to landowners, land managers, public agencies, and other Watershed residents. These benefits include reduction in risk of flooding and fire, improvements in water quality, increases in surface water supply, and restoration of habitat for native species, including several threatened and endangered species.

The numerous parties making up Team *Arundo* within the watershed are clearing *Arundo* from many areas, including the upper tributaries of the Watershed. Section 3A-2 lists *Arundo* distribution and historical specific removal efforts within the Watershed, as described by Neill and Giessow (2001). Appendix D provides an *Arundo* Removal Protocol, produced by SAWPA. By providing necessary funding, the Southern California Integrated Water Program *Arundo* Removal Program will greatly accelerate *Arundo* removal efforts within the Watershed.



Citrus groves, shown here in the Santa Ana River wash area near Redlands, historically served as an economic base of the Watershed.

Photo courtesy of SAWPA



Although not nearly as pervasive, perennial pepperweed has been referred to as “the next *Arundo*.” Like other invasive species, pepperweed harms native flora and fauna by outcompeting native species, and forming a monoculture that is inhospitable to native and special status wildlife species such as the least Bell’s vireo.

Implementation

1. Continue seeking funding for further removal of *Arundo* and other invasive species and long term monitoring of previous removal efforts.
2. As groups remove *Arundo* within the watershed, post-removal monitoring should include identification, documentation, and removal of perennial pepperweed for a minimum of three years. This recommendation is crucial for the Hidden Valley area to prevent spread of pepperweed to the Riverside County Parks land above Van Buren Bridge. Control of the species below Prado Dam is crucial to prevent spread to the Orange County River Channel.
3. Facilitate other groups beyond Team *Arundo* members to perform removal and maintenance.
4. Facilitate efforts by agencies and groups who maintain the river.

3. Increasing Connectivity of Regional Trail System

Many recreational efforts are focused on the Santa Ana River Trail, an important regional recreational element. First conceived over a century ago and formally proposed in 1955, the Santa Ana River Trail is a much-anticipated project with watershed-wide support. Within the Santa Ana Watershed, no other issue seems to

spark as much enthusiasm or inspire as much collaboration between diverse interests as trail planning. Trails are viewed as valuable resources—providing connectivity, transportation alternatives, scenic relief to urban dwellers, recreational opportunities, and linear parkways with opportunities for environmental restoration as well as education. Opportunities for multi-benefit projects that incorporate trail planning, open space acquisition, wetlands/habitat enhancement, and educational/interpretive components are desirable. Watershed planning participants agree that the trail should provide access for a wide variety of users, including walkers, hikers, joggers, bicyclists, horseback riders, users in wheelchairs, rollerbladers, and skateboarders. Some of these users require special features, such as wheelchair access or equestrian staging areas.

Implementation

Trail Completion

1. Construct those sections of the Santa Ana River Trail for which funding has been secured (namely, Phase I in San Bernardino County).
2. Secure funding for completion of those sections that have been planned: Phases II, III, and IV in San Bernardino County and Phase I: Part 2, Phase IIIB: Part 2, Phase IV, and Phase V in Riverside County.
3. Complete other vital links such as Temescal Wash/San Jacinto Wash to San Jacinto Mountains and connections to the new San Timoteo State Park
4. Best utilize up to \$10.0 million in funding recently provided by Proposition 40 to complete the trail in the Watershed.
5. Employ better communication and integrated review to assist city/county planners in assessing trail impacts when



considering proposed projects. Trail users are concerned about pieces of potential trail connections disappearing permanently once development is approved without provision for trails. Therefore, there is a need to coordinate trail planning efforts with other project efforts to avoid conflicting land uses. For example, each county's Parks and Recreation/Trail Planning Department should coordinate with other County and City partners regarding potential projects (e.g., planning and public works projects).

6. Integrate individual cities' trail planning efforts to ensure connectivity and to ensure that the Santa Ana River Trail's usefulness reaches its full potential.
7. Institute a trail overseer role. For example, SAWPA could assist the watershed community in developing a trail overseer role, so that when proposed projects undergo environmental review through the CEQA process, not only will the lead agency/City/County look at trail impacts, but the trail overseer could also do the same.

Amenities

8. Ensure consistent trail mileage. Orange County's mileage system begins with the Pacific Ocean as Mile Zero, and this mileage system should be carried out along the length of the Trail, with the connection to the Pacific Crest Trail approximating Mile 110. A mileage system is an important safety issue because it allows users to know their location, distance traveled, and distance left to travel. In addition, those training for marathons and other fitness events that require specific mileage goals during training may use the trail.

9. Trail should include the availability of water fountains for user refreshment and safety.
10. Trail should include restroom access, such as maintained port-a-potties.
11. Trail should include frequent shade trees to provide relief from the sun and heat of inland Orange, Riverside, and San Bernardino Counties. Native species should be used for these shade trees.
12. Trail should include staging areas for equestrian use and paddocks to serve as rest areas for horses.
13. Trail should include bike racks to allow riders to secure bicycles when using trailside amenities.
14. Trail should include ample disposal facilities for garbage, including garbage cans, recycling bins, and elevated "bicycle-friendly" garbage cans that are convenient for bikers to utilize.
15. Trail should include access to air hoses for bikes that need to inflate their tires.
16. Trail should include interpretive signage for environmental and wildlife education.



More equestrian connections to the riverbed are needed, such as this one near Anza Narrows Park in Riverside.

Photo courtesy of EIP Associates



17. Trail should include some bike n’ hike primitive campgrounds for those interested in biking or riding from coast to crest (these campgrounds should be accessible by foot, not requiring a car). One challenge in implementing these campgrounds will be security issues, including personal safety and emergency vehicle access.

**ESSENTIAL RESOURCE
CONSERVATION AREAS**

These areas have been identified by Watershed planning participants as vital areas for acquisition and conservation

Source: Watershed Stakeholders, SAWPA Scoping Meeting, August 14, 2002

1. Santa Ana River Mouth to Fairview Park
2. Bolsa Chica Wetlands
3. Upper Newport Bay
4. Lower Newport Bay
5. Santiago Creek
6. Temescal Canyon
7. Palomar- Santa Ana Mountains linkages
8. Featherly Park
9. Prado Basin
10. Coal Canyon
11. City of Chino- Sphere of Influence
12. Box Springs Mountains
13. San Timoteo Canyon
14. Carbon Canyon Creek
15. Connection from City of Whittier to Chino Hills State Park
16. Lytle Creek
17. Mystic Lake

Other Implementation

18. Continue outreach and contact with law enforcement to pursue trail access and safety.
19. To draw attention to the trail, its planners should host annual 2-day Bike n’ Ride events with camping on the first night. This event could be timed such that participants could join in at various points along the trail.

4. Multi-objective Conservation Planning and Projects

Several areas within the watershed offer excellent opportunities for habitat acquisition, enhancement, and restoration. Watershed participants recognize that habitat acquisition is equally important as habitat restoration.

Recommended Strategies

Recommended strategies for restoration included habitat enhancement, beach renourishment, and revegetation projects. Potential restoration projects include culvert daylighting, as discussed in Section 2G, Flood Control. In addition to restoring ecological function, appropriate implementation of these restoration activities can prevent listing of threatened and endangered species, as well as providing economic and other benefits to the region. Economic and public safety benefits of removing invasive species are discussed in Section 3C-2, Invasive Species Removal. Additionally, beach renourishment provides recreational and economic benefits to the region. Recovery efforts should favor multiple species projects.

Strategies for thinking ahead to create a conservation plan that ensures the long-term



viability of the watershed’s native flora, fauna, and aquatic communities will prevent degradation of the watershed’s delicate ecosystem. A framework for these strategies is found in Section 3A-4. By overlaying significant resource data such as the Riverside County land acquisition priority map with other watershed studies, better decisions will be made with regard to habitat restoration and enhancement efforts. Planning and discussion amongst key watershed participants will ensure that the best possible targets for restoration land acquisition will be selected.

A related strategy proposed in this plan, which could help to prevent sensitive or threatened species from becoming endangered, would be the creation of an Aquatic Resources Committee (ARC) under the administration of SAWPA, expanding the role of the Santa Ana Sucker Discussion Group to include other native fish. While participation in the ARC would be voluntary, the objective would be to encourage the active involvement of State and federal resource agencies, cities, counties, other local jurisdictions, and the private sector in coordinating and developing programs and specific projects focused on preventing future listing of native fish such as the arroyo chub and the speckled dace. Refer to Appendix G, Aquatic Resources Assessment, for more detail.

5. Education

Public Outreach

Public education will make clear the linkages between the condition of the watershed and the health and well being of the population, wildlife, habitat, the River, and the ocean. Public service campaigns address non-point source pollution and the reduction of trash, animal waste, organic

matter, and other contaminants that wash into the ocean via storm drains and river systems. Public involvement programs should also encourage residents to become involved in the cleanup of the rivers, and build upon existing programs, such as the use of volunteers in monitoring river water quality.

In addition to those issues most directly related to the condition of the watershed, outreach programs should also address broader environmental issues, including watershed resource sustainability. At the simplest level, resource sustainability is the ability to meet current needs without compromising the ability of future generations to meet their own needs. This goal encompasses a range of concepts, such as recycling, energy and water conservation, use of appropriate building types and materials, minimizing use of hazardous materials, appropriate transportation planning and the purchase of environmentally friendly products and packaging.

Educational Programs

Educating children and young adults is equally important as continuing education for adults. Incorporating more environmental and water resource education into school curriculum, including as many field trips and hands-on programs as feasible, is the most effective way to ensure that the watershed’s next generation will be commendable environmental stewards.

Education programs for children should build upon the extensive network of existing resources, such as the California Plan for Environmental Education, the California Regional Environmental Educational Center—Regions 9a and 10 (www.creec.org), Global Learning and Observations to Benefit the Environment (<http://>



Educational Program Types	Notable Santa Ana Watershed Examples
Nature centers and interpretive exhibits	Expansion of Santiago Oaks Regional Park's educational facilities to include a Watershed and Nature Education Center with high-tech innovative exhibits (in progress)
Tours	The Orange County Water District (OCWD) offers tours of the Prado Wetlands led by a naturalist. To sign up for a tour, go to http://www.ocwd.com/_html/tour.htm . Eastern Municipal Water District (EMWD) offers tours of the Hemet/San Jacinto Constructed Wetlands, and Elsinore Valley Municipal Water District (EVMWD) offers student tours.
Brochures/flyers	"The Good, the Bad, and the Invasive," Santa Ana Watershed Association of RCD's invasive plant educational brochure
Events/meetings	Annual Coastal Clean-up, held each September and hosted by a number of organizations including inland cleanups sponsored by Trails 4 All
Curriculum development	California Coastal Commission compilation of K-12 curriculum specific to Upper Newport Bay with hands-on restoration activities (in progress) . EVMWD offers classroom presentations, books, and student/teacher workbooks. Riverside Corona RCD and OCWD are developing curriculum on invasive species and the importance of wetlands. Western Municipal Water District (WMWD) offers the Water Conservation Garden Activity Book: a teacher's guide to activities and lesson plans relating to water conservation.
Homeowner guides and workshops	San Bernardino Municipal Water District's web site www.sbvmd.com , hosts "The Easy Guide To Lawn Watering--Save Water & Cost," including a table that explains the total number of minutes to water your lawn each week. EVMWD offers a landscape workshop series, homeowner water audits, and conservation booklets and materials. WMWD recently published a brochure titled "Guide to Landscape Water Conservation in western Riverside County." The Riverside Lands Conservancy offers a useful and informative booklet titled "Stream Care- Every Person's Guide to Healing Waterways.
Videos	Huell Howser's video on the Santa Ana Watershed, Elsinore Valley Municipal Water District (EVMWD) Videos, and SAWA Video, "Arundo's Fatal Grip" with Congressman Calvert (available for purchase for \$17.00)
Job training/scholarships	Orange County Conservation Corps- employs southern California youth to implement environmental projects, including recycling more than 1.6 million pounds of recyclable materials and completion of over 215 projects to maintain parks, beaches, rivers, and trails.
Internships	UC Irvine School of Social Ecology (http://www.seweb.uci.edu/) offers paid internships for university credit.

Table 3-4 Education Program Types and Examples

/www.globe.gov), the Global Rivers Environmental Education Network (<http://www.earthforce.org/green/>), the North American Association of Environmental Educators (<http://www.naaee.org/>), the U.S. EPA's Water Office Kid's Page (<http://www.epa.gov/kids/>), Earth 911 (<http://www.earth911.org/usa/master.asp>), and Water Education for Teachers (<http://www.projectwet.org/>).

Education programs for adults should include development of backyard habitat for wildlife, gardening techniques that minimize pesticide and herbicide use, natural methods of pest control, composting, organic gardening, planning and construction of stormwater drainage systems that promote groundwater infiltration, low water gardening and landscaping using improved irrigation technology and mulches.

Interpretive Opportunities

The Santa Ana Watershed Project Authority and its member agencies could work with Caltrans to implement a signage program for the Watershed. The Watershed and Waterway Signage Program would enlighten Santa Ana Watershed residents as to which watershed they reside in and familiarize them with the names of local waterways. With the help of Caltrans and the California Resources Agency, this program could be implemented Statewide to create a network of watershed signage. California residents and visitors would not only grasp the concept that "wherever you are, you're in a watershed," but would become familiar with the names of the watersheds they live in and travel through, thus creating these important connections to the land and water.

6. Partnerships

Assembling seemingly conflicting interests at same table to resolve issues of concern has proven



very successful within the Santa Ana Watershed, and has resulted in unique and effective partnerships. Whereas watershed planning may be *easier* within smaller watersheds, the difficulty of planning within larger watersheds is balanced by the ability to affect large-scale regional resource management and the opportunity to pool resources on a regional scale. This Watershed benefits from the significant efforts of agencies, organizations, and the communities who are dedicated to improving the ecological health of this region. From invasive plant species (*Arundo*) removal to trails, river parks, dairy waste clean-up, and conservation measures for endangered species, such as the Santa Ana sucker fish, the Santa Ana Watershed is leading the way in building partnerships which produce real results.

Chino Basin Partners

- Inland Empire Utilities Agency
- Santa Ana River Watershed Group (SARWG)
- Milk Producer’s Council
- Synagro
- Orange County Water District
- Chino Basin Watermaster
- All of the Chino Basin Cities
- Santa Ana Watershed Project Authority
- U.S. Department of Agriculture/Natural Resources Conservation Service
- U.S. Department of Energy and the California Energy Commission
- Santa Ana Watershed Association of Resource Conservation Districts
- San Bernardino County
- Orange County Flood Control
- Orange County Sanitation District

Examples of notable partnerships are outlined in Section 3A-6. Many more partnerships are forming as awareness of the need to plan on a watershed level is increasing.

Implementation

1. The Santa Ana Watershed community should continue to create new partnerships and projects that improve the ecological health of the natural systems of the Watershed. SAWPA and other interested agencies, organizations, and individuals could help facilitate this process.

Santa Ana River Trail Partners

<p>Counties: Riverside Orange San Bernardino</p> <p>Cities: Colton Highland Loma Linda Redlands Riverside Anaheim Orange Santa Ana Villa Park Corona Huntington Beach Norco Rialto San Bernardino</p>	<p>Agencies: Orange County Water District U.S. Forest Service, San Bernardino National Forest Santa Ana Watershed Project Authority U.S. Army Corps of Engineers California Department of Parks and Recreation National Park Service, Rivers and Trails Conservation Assistance Orange County Sheriff’s Office</p> <p>Organizations: Orange County Equestrian Coalition Loma Linda University Community Outreach Trails 4 All San Bernardino Riders Mike Carona Foundation Wildlands Conservancy</p> <p>Consultant Groups: Dangermond Group EDAW Withers and Sandgren</p>
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Santa Ana Sucker Discussion Group

SUPPORTING PARTICIPANTS:

- City of Riverside
- City of San Bernardino
- County of Orange PFRD
- Orange County Sanitation District
- Orange County Water District
- Riverside County Flood Control and Water Conservation District
- San Bernardino County Flood Control District
- SAWPA

OTHER PARTICIPANTS:

- U.S. Fish and Wildlife Service
- California Department of Fish and Game
- Santa Ana Regional Water Quality Control Board
- Riverside-Corona RCD
- City of Corona

2. SAWPA should continue to facilitate Watershed discussions to educate and inform Watershed leaders in the community about funding opportunities and partnerships that would be beneficial to initiating and completing projects identified through this Plan and beyond.
3. SAWPA should continue to work with the counties and appropriate cities to expand Watershed cooperation.
4. County and city planners should participate in Watershed project discussions so that the process of implementing the projects identified in this Plan is carried forward.
5. SAWPA should continue to develop and sponsor watershed and subwatershed groups and task forces.
6. Watershed participants should invest resources to ensure that watershed

interests such as connectivity, trails, open space, biological diversity, water quality and supply, wetlands, are supported and included in the County of San Bernardino General Plan Update.

7. As projects are proposed through collaborative funding opportunities, watershed partners should utilize the MSHCP in making decisions regarding land acquisition areas within Riverside County.
8. Watershed stakeholders should continue to engage in watershed-wide (interjurisdictional) collaboration regarding connectivity, trails, and other watershed needs so that landscape linkages, public/private partnerships, acquisition, in-holdings, and public coastal access goals are realized in the County of Orange General Plan Update and related planning efforts.

7. Funding

Watershed participants agree that one of the greatest obstacles to implementing good projects in the region is the lack of reliable funding. While significant seed money and partnerships are currently in place for a number of watershed projects such as the Santa Ana River Trail completion and *Arundo* removal, there are many more projects, both large and small, which require funding. This document highlights many of the projects that would result in improvements within the Watershed. It also identifies funding needs for these projects. If funding can be secured for these projects through increased awareness of the needs of this community, then one fundamental goal of this watershed plan will have been accomplished. Long term funding needs include provisions for operation and maintenance of projects.



In an effort to facilitate greater understanding of potential funding sources available to project proponents, Table 3-6, Potential Watershed Project Funding Sources was compiled (U.S. Environmental Protection Agency, Catalog of Federal Funding Sources for Watershed Protection, Second Edition, and from the Los Angeles Regional Water Quality Control Boards website, Summary Document on Grant Funding Sources).

8. Assessment and Monitoring

Outcome indicators are a useful way to measure change within an area. In this case, outcome indicators are used as part of the Santa Ana Integrated Watershed Plan, Environmental and Wetlands Component to measure changes in the Santa Ana Watershed as a result of the efforts of SAWPA, SAWPA’s member agencies, other governmental agencies, and citizens’ groups. These changes are the result of projects identified within the plan and other opportunities implemented throughout the Watershed.



South fork of the Santa Ana River
Photo courtesy of SAWPA

Examples of Measurable Goals and Indicators

Examples of measurable goals and indicators are identified for each of the watershed structure and function restoration principles that follow.

1. Protect and Restore Habitat Resources

Remove Invasive Exotic Species

- Acres of land from which exotics have been removed
- Percentage of this land that has remained invasive-free after 5 years, 10 years, etc.
- Amount of new riparian habitat created



Prado Wetlands
Photo courtesy of SAWPA

2. Improve Water Quality and Avoid Future Reductions to Ecosystem Function

Improve Water Quality

- Number of impaired water bodies within watershed (waterbodies removed from the State Water Resources Control Board’s 303(d) List of Impaired Waterbodies)
- Use water quality indicators such as dissolved oxygen, salinity, turbidity, and temperature.
- Percentage of groundwater basins that meet drinking water standards



Increase Water Conservation/Decrease Imported Water Use/Reduce Salinity

- Watershed wide use of recycled water (measured by millions of gallons per day)
- Per capita daily water use (measured by gallons per day)
- Amount of water imported to the Watershed (measured by acre-feet per year)
- Use of local water sources and storage of local water (measured by acre-feet per year)
- Water “banked” in groundwater basins (measured by acre-feet per year)
- Reduction and elimination of sources of salt in the Watershed

3. Engage the Community through Education and Recreational Opportunities

Improve Outdoor Recreational Opportunities

- Miles of biking and hiking trails within the Watershed
- Number of mega-connected trails (e.g. over 5 miles long)
- Number of publicly provided camping sites
- Number of equestrian staging areas

Increase Open Space

- Acres of land under protection on various levels within the watershed (e.g., private, city, county, state, and conservation easements)
- Acres of land covered in permeable vs. nonpermeable surfaces
- Public space acreage per 1,000 people (from SCAG data)
- Acreage of open space that provide multi-purpose benefits

Promote Watershed Education / Community Outreach

- Percentage of watershed residents that can accurately answer the questions, “What is a watershed?” and “What watershed do you live in?”
- Incorporation of water conservation curriculum into Orange County, Riverside County, and San Bernardino County Schools
- Participation of watershed residents in annual Coastal Clean-up (sponsored by the Center for Marine Conservation)

4. Plan for the Future

Identify Future Sources of Funding

- Number of grant applications made for watershed projects from
 - a. Local funding sources
 - b. State funding sources
 - c. Federal funding sources
- Number of grants won for watershed projects from
 - a. Local funding sources
 - b. State funding sources
 - c. Federal funding sources
- Operational and maintenance funding budgeted (measured per millions of dollars invested)
- Number of broad programmatic funding sources identified



Opportunities

A number of projects have been proposed by watershed stakeholders including cities, counties, agencies, organizations, and individuals. These are projects that may be in need of partnering or funding. While some projects are further along than others, all of these projects would enhance the ecological function of systems within the Watershed. Types of projects include wetlands, education, trails, habitat, and invasive species removal. Many of these are multi-objective conservation projects serving two or more ecological purposes. Refer to Table 3-9, Watershed Projects and Opportunities as well as the Watershed Projects Maps in Section 3A-8. The legend in the map identifies the project categories. In addition,

Appendix A, Scoping Meeting Notes includes more detail on a number of projects and opportunities.

Next Steps

Plan Life Continues Beyond Today

In as much as this Plan presents a snapshot of the innovative projects and summarizes the plans and projects of many agencies, it will quickly age. SAWPA has received excellent feedback from agencies, groups, and individuals in this process.

The dynamic nature of projects and plans in the Watershed necessitates their update and renewal on a relatively frequent basis. This Plan will be



Santa Ana River, San Bernardino County, near the proposed Santa Ana River Trail Alignment.
Photo courtesy of EIP associates



used by agencies in the Watershed to help integrate plans and to focus funding on projects that are most effective and ready to proceed. This information must remain current to be effective.

Additionally, revisions to this Plan's strategies aimed at restoring the ecological function of the Watershed will develop over time forming a culture for the Watershed community. Future revisions of this document will capture these developments, new projects that are created, and projects currently listed that develop and evolve.

The SAWPA Commission will adopt this document as part of the Integrated Watershed Plan for the Santa Ana River Watershed and will use it to guide funding and development priorities.



Prado Wetlands

Photo courtesy of SAWPA

As the need arises for updates and the funding becomes available, SAWPA will initiate efforts to update and refine this Plan. Necessary elements for inclusion in Phase II of the Environmental and Wetlands Component are as follows:

- More information on the natural history of the watershed, including vegetation descriptions.
- An assesment of remaining significant habitat is needed. This assessment is essential for setting priorities. A more detailed description of natural resources, including vegetation, and a more comprehensive analysis of the ecological function of the Santa Ana River is needed.
- An expanded, more comprehensive assessment of ecological/open space/recreational resources and their significance to the region, the state, and the nation would be useful in seeking further funding.
- Further information to explain what is special about the Santa Ana Watershed as a system, and what it contributes to California's and the nation's resources overall.
- Development of a multi-benefit, multi-agency strategy to help achieve agreed-upon watershed goals.
- Gap analysis for the watershed.
- Development of a coordinated, multi-benefit, multi-agency strategy to help achieve agreed upon watershed goals.



Given that everyone associated with the Santa Ana Watershed is inextricably linked from the mountains to the Pacific Ocean, additional partnering with State, federal, and regional agencies to further watershed planning efforts is vital. The actions of upstream users impact the quality of life of downstream users, and keeping this connection in mind is very important to improving both the overall ecological function of the watershed and the quality of life of its residents.

Finally, further efforts to engage the planning community (i.e., community development and planning staff at Watershed cities and other agencies at every level of government as well as private sector planning) should include training, workshops, and other educational forums to facilitate free exchange of innovative ideas and information related to the implementation of watershed planning. Realization of the recommendations and projects in this document and future iterations of this document require planning staff engagement and dedication to ensure implementation of the overall Santa Ana Integrated Plan and the Environmental and Wetlands Component. By protecting its resources, the Santa Ana Watershed community is making progress toward a healthier and more ecologically sustainable watershed through continued collaboration and leadership.

